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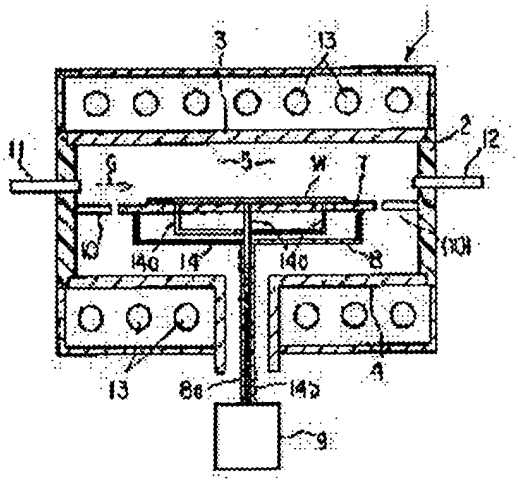
(54) SHEET TYPE VAPOR GROWTH DEVICE

(57)Abstract:

PURPOSE: To provide a sheet type vapor growth device having high treatment efficiency by lessening the waiting time for cooling until wafers after a process treatment for forming CVD films are cooled down to a temp. at which transportation of these wafers is possible and eventually increasing the number of sheets of the wafers which can be treated in a specified period of time.

CONSTITUTION: Quartz which hardly absorbs the light energy for passing light energy is adopted for the material of a susceptor 7 which is a wafer supporting plate. The light energy from heating lamps 13... is less absorbed in this quartz susceptor 7 than in the conventional graphite susceptor by adopting such quartz susceptor 7. The quartz susceptor is thus kept at a relatively low temp. and only the wafers W are rapidly heated by absorbing the light energy. Since the wafers W are more rapidly cooled, the waiting time to attain the temp. at which a robot for transportation is usable is shortened and eventually the throughput is improved. The number of the sheets which can be treated for the specified period of time is eventually increased.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The fission reactor with which at least a part consists of transparent members thermally [a quartz etc.], and forms a reaction chamber in the interior, The wafer support plate for being prepared in said reaction chamber of this fission reactor, and laying the wafer which is a processed material, In the single-wafer-processing vapor growth equipment which comes to provide the heat lamp which heats the wafer which emitted heat in said reaction chamber from the outside of said reaction chamber, and was supported by said wafer support plate Single-wafer-processing vapor growth equipment characterized by having used the quality of the material of said wafer support plate as the quartz, and making thickness of the wafer support plate made from this quartz into about 0.5-2mm in thickness comparable as a wafer.
[Claim 2] Single-wafer-processing vapor growth equipment according to claim 1 characterized by said heat lamp consisting of an infrared lamp which heats the temperature of said wafer at 400-1000 degrees C.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the single-wafer-processing vapor growth equipment which improved the wafer support plate for laying the wafer which is a processed material.
[0002]
[Description of the Prior Art] Conventionally, what is shown in drawing 7 as single-wafer-processing vapor growth equipment is known. It is the fission reactor which has the walls (it is henceforth called a quartz aperture) b and c which consist of a quartz on a top face and the inferior surface of tongue, and the reaction chamber d is formed in this fission reactor a by the inside a of drawing.
[0003] As shown in drawing 8 , while the wafer support plate e made from the graphite for laying the wafer W which is a processed material (susceptor) was formed in this reaction chamber d, two or more heat lamp f-- was being arranged in the outside of said quartz apertures b and c and a corresponding part, respectively.
[0004] And the infrared radiation which came out of two or more heat lamp f-- passes these quartz apertures b and c, and while the wafer support plate e made from the graphite in a reaction chamber d absorbs this infrared radiation and is heated, Wafer W is directly heated through the field where this wafer support plate e that was heated and became an elevated temperature touches Wafer W.
[0005] After Wafer W is heated by predetermined temperature, reactant gas G is introduced in a reaction chamber d from gas inlet g, by this, thermal reaction will occur on the front face of Wafer W, and the CVD film will be formed on Wafer W.
[0006] Then, to the temperature by the robot for conveyance (not shown) which is a wafer conveyance means which can be conveyed, the wafer W with which the CVD film was formed will wait for Wafer W to cool, and will be taken out from a reaction chamber d.
[0007] As mentioned above, if it is in this kind of equipment, the cooldown delay for taking out Wafer W from a reaction chamber d with the robot for conveyance which is a wafer conveyance means is greatly related to a throughput after CVD film formation process processing.
[0008] The wafer support plate e made from graphite is used, and heat capacity is large so that it may have the function of a heat regulator (thermal fly wheel), and this wafer support plate e made from graphite is hard to be cooled conventionally.
[0009] Therefore, it had taken long time amount until the wafer W currently laid in this wafer support plate e made from graphite cooled to the temperature which can use the hand (contact part for taking out a wafer) of the robot for conveyance and which can be conveyed.
[0010]
[Problem(s) to be Solved by the Invention] since the wafer support plate for lay the wafer which be a processed material be a product made from graphite with large heat capacity in conventional single wafer processing vapor growth equipment as describe above , after stop lamp heating before cool to the temperature which can convey a wafer after CVD film formation process processing , long time amount be took , a throughput could not be enlarged , but there be a problem that where of it had be a failure

when raise processing efficiency .
[0011] It is going to offer the high single-wafer-processing vapor growth equipment of the processing efficiency which this invention was made based on the above-mentioned situation, and the place made into the purpose lessens cooling time to wait until it is cooled to the temperature which can convey the wafer after CVD film formation process processing, and enabled it to make [many] the wafer number of sheets which can be processed to fixed time amount as a result.
[0012]
[Means for Solving the Problem] The fission reactor with which at least a part consists of transparent members thermally [a quartz etc.], and forms a reaction chamber in the interior that this invention should solve the above-mentioned technical problem, The wafer support plate for being prepared in said reaction chamber of this fission reactor, and laying the wafer which is a processed material, In the single-wafer-processing vapor growth equipment which comes to provide the heat lamp which heats the wafer which emitted heat in said reaction chamber from the outside of said reaction chamber, and was supported by said wafer support plate The quality of the material of said wafer support plate is used as a quartz, and thickness of the wafer support plate made from this quartz is made into about 0.5-2mm in thickness comparable as a wafer.
[0013]
[Function] According to the single-wafer-processing vapor growth equipment of this invention, it considers as the quartz which does not absorb light energy so much in order to pass light energy for the quality of the material of a wafer support plate. The thickness of the wafer support plate made from this quartz and by carrying out to about 0.5-2mm in thickness comparable as a wafer If only a wafer can be efficiently raised to the target temperature and lamp heating is stopped after CVD film type process processing, maintaining this wafer support plate at comparatively low temperature, since it is [that a wafer support plate is maintained at comparatively low temperature] thin, A wafer is compared with the case where the wafer support plate is produced by graphite like before. Since it cools early more, the latency time until it becomes the temperature which the robot for conveyance can use can decrease, a throughput can improve as a result, and the wafer number of sheets which can be processed to fixed time amount can be made [many].
[0014]
[Example] Hereafter, one example of this invention is explained with reference to drawing 1 - drawing 3 . First, with reference to drawing 1 , the whole single-wafer-processing vapor growth equipment 1 configuration is explained. Two in drawing is a fission reactor which has the walls (it is henceforth called a quartz aperture) 3 and 4 which consist of a quartz on a top face and the inferior surface of tongue, and the reaction chamber 5 is formed in this fission reactor 2.
[0015] In this reaction chamber 5, the wafer support plate 7 made from a quartz (it is henceforth called a susceptor) is formed, and the wafer W which is a processed material is laid. This susceptor 7 is supported by the susceptor support 8 as a susceptor maintenance device, a rotation drive is carried out by the susceptor rotation mechanical component 9, and said susceptor 7 rotates the susceptor support 8 to one by it.
[0016] In the reaction chamber 5, the dashboard 10 which surrounds a susceptor 7 in the state of the same height as said susceptor 7 is formed, and reactant gas G flows the top-face side of this dashboard 10 from an end side to an other end side.
[0017] 11 is gas installation tubing which introduces said reactant gas G in a reaction chamber 5, and 12 is flueing tubing which exhausts gas. Moreover, two or more heat lamp 13 -- which consists of an infrared lamp for heating said wafer W in a reaction chamber 5 is arranged in the outside of said quartz apertures 3 and 4 and a corresponding part, respectively, infrared radiation is irradiated in a reaction chamber 5 through the quartz apertures 3 and 4, and the temperature of said wafer is heated at 400-1000 degrees C.
[0018] Moreover, the wafer ** top device 14 in which the wafer W laid in the susceptor 7 is lifted if needed is formed in the inferior-surface-of-tongue side of a susceptor 7. This wafer ** top device 14 has two or more ** top pin 14a-- inserted in two or more ** top pin insertion hole 7a-- formed in the

susceptor 7. By making the upper part carry out a variation rate according to the vertical device which shaft 14b which penetrates revolving-shaft 8a of said susceptor support 8 does not illustrate The upper limit section projects to the top-face side of a susceptor 7, and it raises to the location which can take out Wafer W with the carrier robot of two or more of said ** top pin 14a-- which does not illustrate as the two-dot chain line of drawing 2 shows.

[0019] The quality of the material is a quartz, the thickness t is about 0.5-2mm of thickness comparable as Wafer W, and said susceptor 7 is flat [the front face]. A deer is carried out and the wafer W with which the infrared radiation which came out of two or more heat lamp 13 -- passed the quartz apertures 3 and 4, and was laid on the susceptor 7 made from a quartz in a reaction chamber 5 is heated directly.

[0020] After Wafer W is heated by predetermined temperature, reactant gas G is introduced in a reaction chamber 5 from a gas inlet 11, by this, thermal reaction will occur on the front face of Wafer W, and the CVD film will be formed on Wafer W.

[0021] Then, the wafer W with which the CVD film was formed waits for cooling of Wafer W, will be lifted by two or more ** top pin 14a--, and will be taken out from a reaction chamber 5 by the robot for conveyance (not shown) which is a wafer conveyance means.

[0022] A susceptor 7 is a product made from a quartz, and in this invention, since it is fabricated thinly as mentioned above, in order for this susceptor 7 made from a quartz not to have most light energies from heat lamp 13 -- absorbed, it is kept relative to low temperature, and Wafer W absorbs light energy and becomes an elevated temperature.

[0023] Therefore, compared with the temperature curve which comes to show as a continuous line among drawing 3 , and is shown with the broken line when using the conventional susceptor made from graphite, sudden heating of Wafer W and sudden cooling of the temperature curve of the wafer when using the susceptor 7 made from a quartz are attained.

[0024] Therefore, cooling time to wait until it is cooled to the temperature which can convey the wafer W after CVD film formation process processing can be lessened, and the wafer number of sheets which can be processed to fixed time amount as a result can be made [many].

[0025] In addition, in the one above-mentioned example, although what has the flat front face of the susceptor 7 made from a quartz was explained, it is not restricted to this. That is, as shown in drawing 4 , KUBOMI 7b shallower than the thickness of Wafer W for wafer horizontal gap prevention may be formed in the front face of the susceptor 7 made from a quartz, or as shown in drawing 5 , the thickness of Wafer W and KUBOMI 7c almost for wafer horizontal gap prevention of the same depth may be formed in the front face of the susceptor 7 made from a quartz.

[0026] Moreover, as shown in drawing 6 , another KUBOMI 7d in the center section may be further formed in the front face of the susceptor 7 made from a quartz with the thickness of Wafer W, and KUBOMI 7c almost for wafer horizontal gap prevention of the same depth so that only the periphery of Wafer W may contact.

[0027] In addition, in explanation of the modification of drawing 4 thru/or drawing 6 , the same part as one above-mentioned example attaches the same sign, and omits detailed explanation. In addition, this invention of deformation implementation being variously possible in the range which does not change the summary of this invention is natural.

[0028]

[Effect of the Invention] This invention is used as the quartz which does not absorb light energy so much in order to pass light energy for the quality of the material of a wafer support plate, as explained above. The thickness of the wafer support plate made from this quartz and by carrying out to about 0.5-2mm in thickness comparable as a wafer If sudden heating only of the wafer can be carried out at the target temperature and lamp heating is stopped after CVD film type process processing, maintaining this wafer support plate at comparatively low temperature, since the wafer support plate is maintained at comparatively low temperature, A wafer is compared with the case where the wafer support plate is produced by graphite like before. Since it cools early more, the latency time until it becomes the temperature which the robot for conveyance can use decreases, a throughput improves as a result, and the effectiveness that the wafer number of sheets which can be processed to fixed time amount can be

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The rough block diagram showing one example of the single-wafer-processing vapor growth equipment of this invention.
[Drawing 2] The sectional view of the wafer support plate made from a quartz which is the important section of this example.
[Drawing 3] The explanatory view showing the condition of the wafer temperature in equipment conventionally using this invention equipment and the wafer support plate made from graphite using the wafer support plate made from a quartz.
[Drawing 4] The sectional view showing the 1st modification of the wafer support plate made from a quartz which is the important section of this invention.
[Drawing 5] The sectional view showing the 2nd modification of the wafer support plate made from a quartz which is the important section of this invention.
[Drawing 6] The sectional view showing the 3rd modification of the wafer support plate made from a quartz which is the important section of this invention.
[Drawing 7] The rough block diagram of conventional single-wafer-processing vapor growth equipment.

[Drawing 8] The sectional view of the wafer support plate made from graphite which is the important section of the conventional example.
[Description of Notations]
1 [-- Reaction chamber,] -- Single-wafer-processing vapor growth equipment, 2 -- 3 A fission reactor, 4 -- A quartz aperture, 5 7 -- The susceptor made from a quartz (wafer support plate made from a quartz), 7a -- ** top pin insertion hole, 8 [-- Gas installation tubing, 12 / -- Flueing tubing, 13 / -- A heat lamp, 14 / -- A wafer ** top device, 14a / -- A ** top pin, G / -- Reactant gas, W / -- Wafer (processed material).] -- A susceptor support (susceptor maintenance device), 9 -- A susceptor rotation mechanical component, 10 -- A dashboard, 11

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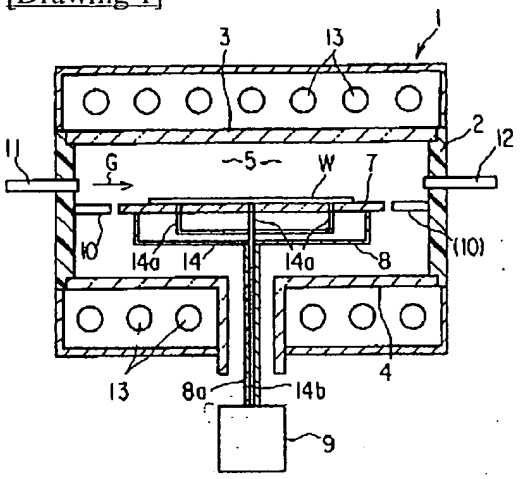
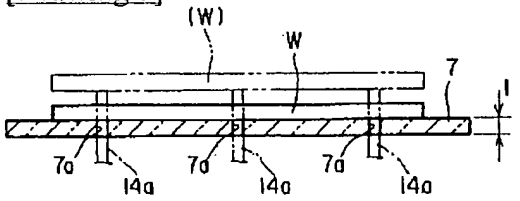
DRAWINGS

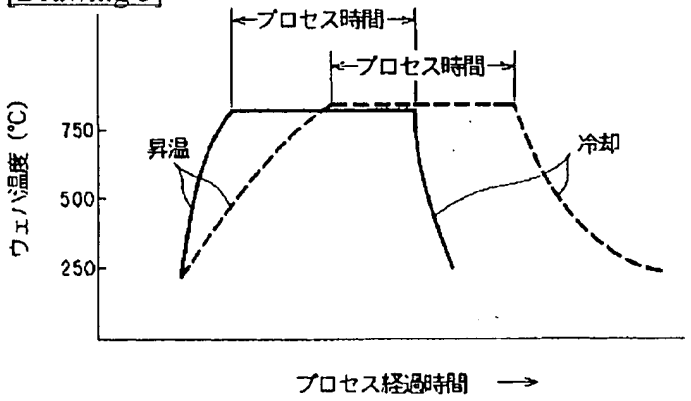
[Drawing 1]



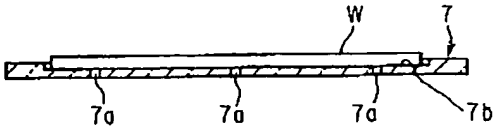
[Drawing 2]



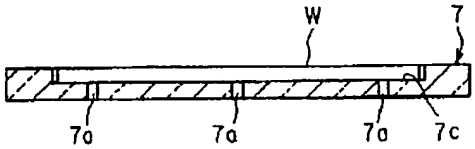
[Drawing 3]



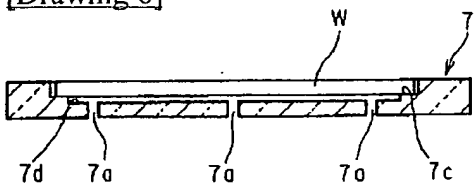
[Drawing 4]



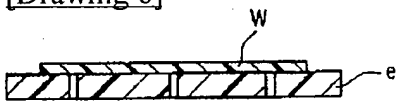
[Drawing 5]



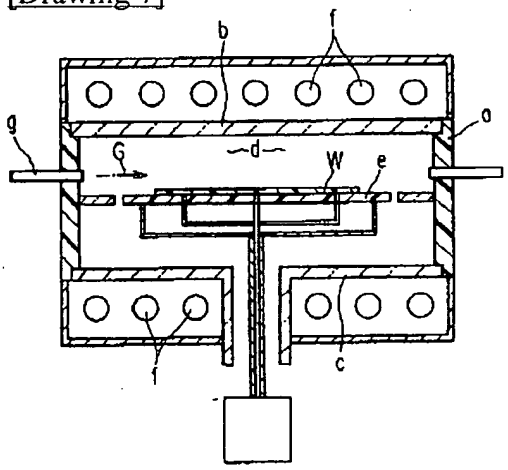
[Drawing 6]



[Drawing 8]



[Drawing 7]



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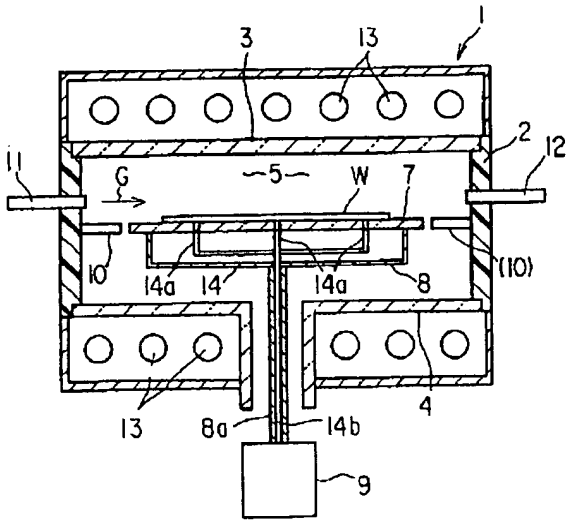
(54)【発明の名称】　枚葉式気相成長装置

(57)【要約】

【目的】ＣＶＤ膜形成プロセス処理後のウエハの搬送可能な温度まで冷却されるまでの冷却待時間を少なくし、結果として一定時間に処理できるウェハ枚数を多くすることができる処理能率の高い枚葉式気相成長装置を提供する。

【構成】ウェハ支持板であるサセプタ７の材質を、光エネルギを通過させるために光エネルギをそれほど吸収しない石英とした。この石英製のサセプタ７とすることにより、この石英製サセプタ７が加熱ランプ１３…からの光エネルギを従来のグラファイト製サセプタと比較して吸収されず、相対的に低い温度に保たれ、ウェハWのみが光エネルギを吸収し急加熱される。また、ウェハWがより早く冷却するので搬送用ロボットが使用できる温度になるまでの待ち時間が少なくなり、結果としてスループットが向上し、一定時間に処理できるウェハ枚数を多くすることができる。



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【特許請求の範囲】
【請求項１】少なくとも一部が石英等の熱的に透明な部材で構成され内部に反応室を形成する反応炉と、
この反応炉の前記反応室内に設けられ被処理物であるウエハを載置するためのウエハ支持板と、
前記反応室の外側から前記反応室内に熱を放射し、前記ウエハ支持板に支持されたウェハを加熱する加熱ランプと、を具備してなる枚葉式気相成長装置において、
前記ウェハ支持板の材質を石英とし、かつ、この石英製のウェハ支持板の厚みを、ウェハと同程度の厚さ約０．５～２ｍｍとしたことを特徴とする枚葉式気相成長装置。
【請求項２】前記加熱ランプが、前記ウェハの温度を４００～１０００℃に加熱する赤外線ランプからなることを特徴とする請求項１記載の枚葉式気相成長装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、被処理物であるウエハを載置するためのウエハ支持板を改良した枚葉式気相成長装置に関する。
【０００２】
【従来の技術】従来、枚葉式気相成長装置として図７に示すものが知られている。図中ａは、石英からなる壁（以後、石英窓という）ｂ，ｃを上面及び下面に有する反応炉であり、この反応炉ａ内には反応室ｄが形成されている。
【０００３】この反応室ｄ内には、図８に示すように、被処理物であるウエハＷを載置するためのグラファイト製のウエハ支持板（サセプタ）ｅが設けられていると共に、前記石英窓ｂ，ｃと対応する部分の外側にそれぞれ複数個の加熱ランプｆ…が配設されたものとなっている。
【０００４】そして、複数個の加熱ランプｆ…から出た赤外線が、この石英窓ｂ，ｃを通過し、反応室ｄ内のグラファイト製のウエハ支持板ｅがこの赤外線を吸収し加熱されると共に、この加熱され高温になったウェハ支持板ｅがウェハＷと接触している面を通して直接的にウェハＷが加熱される。
【０００５】ウェハＷが所定の温度に加熱された後、ガス導入口ｇから反応室ｄ内に反応ガスＧが導入され、これにより、ウェハＷの表面で熱反応が起き、ウェハＷの上にＣＶＤ膜が形成されることになる。
【０００６】この後、ＣＶＤ膜が形成されたウェハＷは、ウエハ搬送手段である搬送用ロボット（図示しない）による搬送可能な温度までウエハＷが冷却するのを待って、反応室ｄから取出されることになる。
【０００７】上記のように、この種の装置にあっては、ＣＶＤ膜形成プロセス処理後、ウエハ搬送手段である搬送用ロボットによりウェハＷを反応室ｄから取出すための冷却時間が処理能力に大きく関係してくる。

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【０００８】従来は、グラファイト製ウェハ支持板ｅを使用しており、このグラファイト製ウェハ支持板ｅは熱調整器（サーマル・フライ・ホイール）の機能を有するよう熱容量が大きいものとなっており、冷却され難い。
【０００９】したがって、このグラファイト製ウェハ支持板ｅに載置されているウエハＷが搬送用ロボットのハンド（ウェハを取り出すための接触部分）が使用できる搬送可能な温度まで冷却するまで長い時間がかかっていた。
【００１０】
【発明が解決しようとする課題】上記したように、従来の枚葉式気相成長装置においては、被処理物であるウエハを載置するためのウエハ支持板が、熱容量の大きいグラファイト製であるため、ＣＶＤ膜形成プロセス処理後、ランプ加熱をやめてからウエハが搬送可能な温度まで冷却するまでに長い時間がかかり、スループットを大きくできず、処理能率を向上させる上での障害となっているといった問題があった。
【００１１】本発明は、上記事情に基づきなされたもので、その目的とするところは、ＣＶＤ膜形成プロセス処理後のウエハの搬送可能な温度まで冷却されるまでの冷却待時間を少なくし、結果として一定時間に処理できるウェハ枚数を多くすることができるようにした処理能率の高い枚葉式気相成長装置を提供しようとするものである。
【００１２】
【課題を解決するための手段】本発明は、上記課題を解決すべく、少なくとも一部が石英等の熱的に透明な部材で構成され内部に反応室を形成する反応炉と、この反応炉の前記反応室内に設けられ被処理物であるウエハを載置するためのウエハ支持板と、前記反応室の外側から前記反応室内に熱を放射し、前記ウエハ支持板に支持されたウェハを加熱する加熱ランプとを具備してなる枚葉式気相成長装置において、前記ウェハ支持板の材質を石英とし、かつ、この石英製のウェハ支持板の厚みを、ウェハと同程度の厚さ約０．５～２ｍｍとしたものである。
【００１３】
【作用】本発明の枚葉式気相成長装置によれば、ウェハ支持板の材質を、光エネルギを通過させるために光エネルギをそれほど吸収しない石英とし、かつ、この石英製のウェハ支持板の厚みを、ウェハと同程度の厚さ約０．５～２ｍｍとする事により、このウェハ支持板を比較的低い温度に保ちながらウエハのみを目的の温度に効率的に上げる事ができ、ＣＶＤ膜形プロセス処理後、ランプ加熱をやめれば、ウェハ支持板が比較的低い温度に保たれ、かつ薄いため、ウェハはウェハ支持板が従来のようにグラファイトで作製されている場合と比較して、より早く冷却するので搬送用ロボットが使用できる温度になるまでの待ち時間が少なくなり、結果としてスループットが向上し、一定時間に処理できるウェハ枚数を多くす

ることができる。

【0014】

【実施例】以下、図1～図3を参照して本発明の一実施例を説明する。まず、図1を参照して枚葉式気相成長装置1の全体構成について説明する。図中2は、石英からなる壁（以後、石英窓という）3，4を上面及び下面に有する反応炉であり、この反応炉2内には反応室5が形成されている。

【0015】この反応室5内には、石英製のウエハ支持板（以後、サセプタという）7が設けられ被処理物であるウエハWが載置されるようになっている。このサセプタ7は、サセプタ保持機構としてのサセプタ支え8によって支持されており、サセプタ支え8はサセプタ回転駆動部9によって回転駆動され、前記サセプタ7が一体に回転するようになっている。

【0016】反応室5内には、前記サセプタ7と同一高さ状態でサセプタ7を囲繞する仕切板10が設けられており、反応ガスGはこの仕切板10の上面側を一端側から他端側に流れるようになっている。

【0017】11は前記反応ガスGを反応室5内に導入するガス導入管であり、12はガスを排気するガス排気管である。また、前記石英窓3，4と対応する部分の外側には、反応室5内の前記ウエハWを加熱するための赤外線ランプからなる加熱ランプ13…がそれぞれ複数個配設されており、石英窓3，4を通して反応室5内に赤外線を照射して前記ウェハの温度を400～1000℃に加熱するようになっている。

【0018】また、サセプタ7の下面側には、サセプタ7に載置されたウエハWを必要に応じて持上げるウエハ持上機構14が設けられている。このウエハ持上機構14は、サセプタ7に形成された複数の持上ピン挿通孔7a…に挿通する複数の持上ピン14a…を有し、前記サセプタ支え8の回転軸8aを貫通する軸14bが図示しない上下機構により上方に変位させることで、前記複数の持上ピン14a…の上端部がサセプタ7の上面側に突出して、ウエハWを図2の二点鎖線で示すように図示しない搬送ロボットにより取出せる位置まで持上げるようになっている。

【0019】前記サセプタ7は、材質が石英であり、その厚みtはウェハWと同程度の厚さの約0．5～2mmであり、その表面が平坦なものとなっている。しかして、複数個の加熱ランプ13…から出た赤外線が、石英窓3，4を通過し、反応室5内の石英製サセプタ7上に載置されたウェハWが直接的に加熱される。

【0020】ウェハWが所定の温度に加熱された後、ガス導入口11から反応室5内に反応ガスGが導入され、これにより、ウェハWの表面で熱反応が起き、ウェハWの上にCVD膜が形成されることになる。

【0021】この後、CVD膜が形成されたウェハWは、ウェハWの冷却を待って、複数の持上ピン14a…

により持上げられウエハ搬送手段である搬送用ロボット（図示しない）により反応室5から取出されることになる。

【0022】本発明においては、サセプタ7が石英製であり、かつ上記のように薄く成形されているために、この石英製サセプタ7が加熱ランプ13…からの光エネルギをほとんど吸収されないため、相対的に低い温度に保たれ、ウェハWのみが光エネルギを吸収し高温になる。

【0023】そのため、石英製サセプタ7を使用した時のウエハの温度曲線は、図3中、実線で示すようになり、従来のグラファイト製サセプタを使用した時の破線で示す温度曲線に比べ、ウェハWの急加熱、急冷却が可能となる。

【0024】したがって、CVD膜形成プロセス処理後のウエハWの搬送可能な温度まで冷却されるまでの冷却待時間を少なくでき、結果として一定時間に処理できるウェハ枚数を多くすることができるものとなる。

【0025】なお、上記一実施例において、石英製サセプタ7の表面が平坦なものについて説明したが、これに限られるものでない。すなわち、図4に示すように、石英製サセプタ7の表面にウェハWの厚みより浅いウェハ横ズレ防止用のクボミ7bを形成したり、図5に示すように、石英製サセプタ7の表面にウェハWの厚みとほぼ同一深さのウェハ横ズレ防止用のクボミ7cを形成したものであっても良い。

【0026】また、図6に示すように、ウエハWの外周のみが接触するように、石英製のサセプタ7の表面にウェハWの厚みとほぼ同一深さのウェハ横ズレ防止用のクボミ7cと、さらにその中央部に別のクボミ7dを形成したものであっても良い。

【0027】なお、図4ないし図6の変形例の説明において、上述の一実施例と同一部分は同一の符号を付して詳細な説明を省略する。その他、本発明は、本発明の要旨を変えない範囲で種々変形実施可能なことは勿論である。

【0028】

【発明の効果】本発明は、以上説明したように、ウェハ支持板の材質を、光エネルギを通過させるために光エネルギをそれほど吸収しない石英とし、かつ、この石英製のウェハ支持板の厚みを、ウェハと同程度の厚さ約0．5～2mmとする事により、このウェハ支持板を比較的低い温度に保ちながらウエハのみを目的の温度に急加熱することができ、CVD膜形プロセス処理後、ランプ加熱をやめれば、ウェハ支持板が比較的低い温度に保たれているため、ウェハはウェハ支持板が従来のようにグラファイトで作製されている場合と比較して、より早く冷却するので搬送用ロボットが使用できる温度になるまでの待ち時間が少なくなり、結果としてスループットが向上し、一定時間に処理できるウェハ枚数を多くすることができるといった効果を奏する。

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【図面の簡単な説明】

【図1】本発明の枚葉式気相成長装置の一実施例を示す概略的構成図。

【図2】同実施例の要部である石英製ウエハ支持板の断面図。

【図3】石英製ウエハ支持板を用いた本発明装置とグラファイト製ウエハ支持板を用いた従来装置におけるウェハ温度の状態を示す説明図。

【図4】本発明の要部である石英製ウエハ支持板の第1の変形例を示す断面図。

【図5】本発明の要部である石英製ウエハ支持板の第2の変形例を示す断面図。

【図6】本発明の要部である石英製ウエハ支持板の第3

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の変形例を示す断面図。

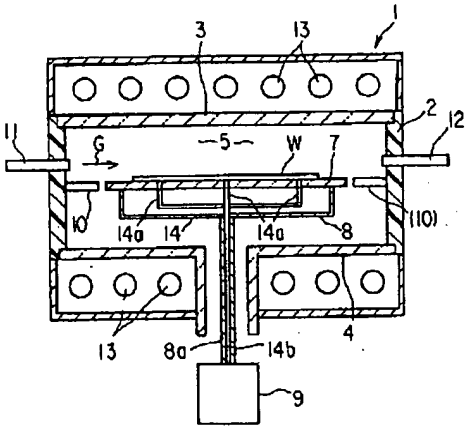
【図7】従来の枚葉式気相成長装置の概略的構成図。

【図8】従来例の要部であるグラファイト製ウエハ支持板の断面図。

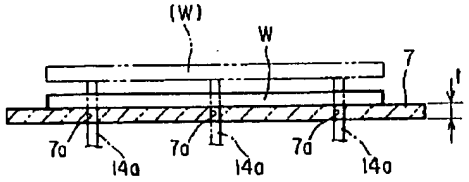
【符号の説明】

1…枚葉式気相成長装置、2…反応炉、3，4…石英窓、5…反応室、7…石英製サセプタ（石英製ウエハ支持板）、7a…持上ピン挿通孔、8…サセプタ支え（サセプタ保持機構）、9…サセプタ回転駆動部、10…仕切板、11…ガス導入管、12…ガス排気管、13…加熱ランプ、14…ウエハ持上機構、14a…持上ピン、G…反応ガス、W…ウエハ（被処理物）。

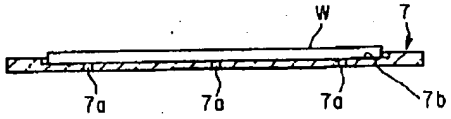
【図1】



【図2】

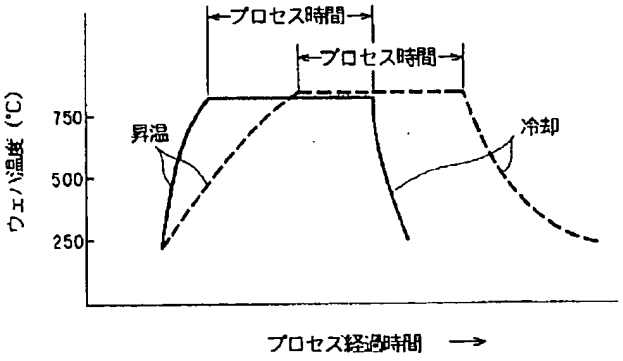


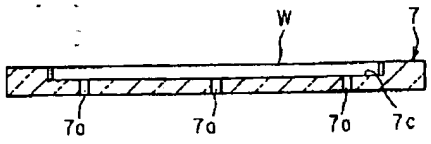
【図4】



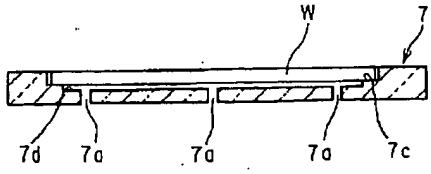
【図5】

【図3】

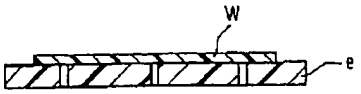




【図6】



【図8】



【図7】